Abstract

~~A~~ **The invention is drawn to a** method for the detection in a given DNA sequence of **known and unknown** DNA mutations, single nucleotide polymorphisms, and insertions and deletions, ~~said~~ **the** method comprising the ~~step~~ **steps** of a) producing replicate(s) with ~~an engineered~~ **a** polymerase of ~~said given~~ **the** DNA sequence **having at least 50% substitutions in at least one of the four DNA bases** ~~with part or all of at least one of the four natural DNA bases exchanged against a not natural base~~; b) using ~~said not natural base~~ **the substitutions** to cleave the replicate(s) obtained in step a) and to produce a DNA product presenting sequence-specific fragments; c) analyzing ~~said~~ **the** sequence-specific fragments obtained in step b) by mass spectrometry to get sequence-specific fragment patterns; and d) using the sequence-specific fragment patterns obtained in step c) to identify sequence changes relative to a reference to ~~said given~~ **the** DNA sequence. **The invention is also directed to a** ~~A~~ kit for the detection of **known and unknown** DNA mutations, single nucleotide polymorphisms, and insertions and deletions.